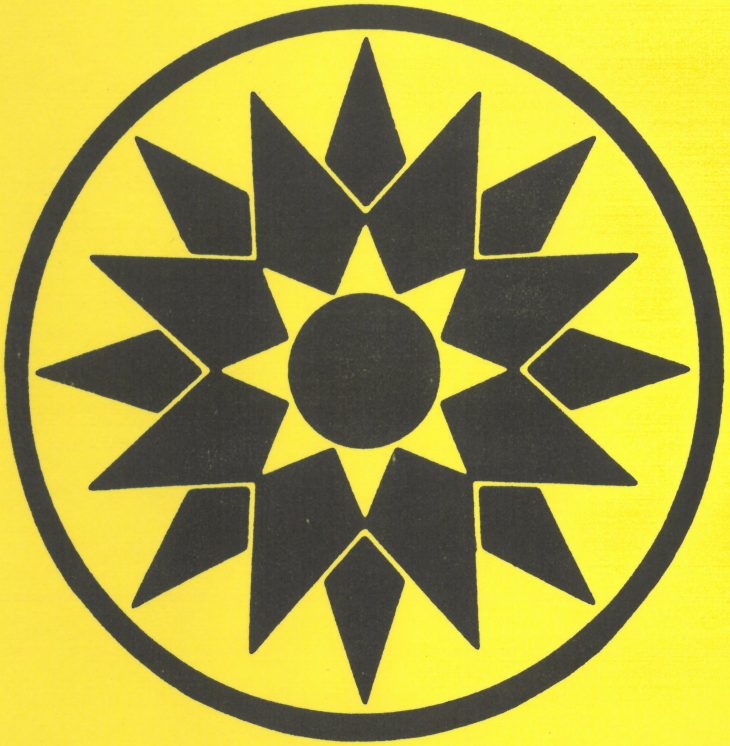
Survival Math

Travel Agent Contest • Foreman's Assistant
Smart Shopper Marathon • Hot Dog Stand

Teacher's Guide (Revised)

Acorn
Apple
Atari
Commodore 64
TRS-80 Model I, III, 4



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SURVIVAL MATH

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SURVIVAL MATH

Introduction

SURVIVAL MATH, a set of four computer programs that simulate realistic situations, is designed to motivate students in grades 7-12 to become actively involved in developing their mathematical skills.

Each program -- Travel Agent Contest, Smart Shopper Marathon, Hot Dog Stand, and Foreman's Assistant -- presents students with real-life problems which they must solve by using their computation skills. Students must also learn to estimate costs, plan budgets, and keep a record of their expenses. Thus, the program helps students meet challenges encountered both in and out of the classroom.

Travel Agent Contest and Smart Shopper Marathon are the least difficult of the four programs. In Travel Agent Contest students work within a given budget to plan a trip to a resort. In Smart Shopper Marathon students are timed as they use various estimation skills to select the best purchases in a supermarket.

Both Hot Dog Stand and Foreman's Assistant make good team projects. Hot Dog Stand requires planning and record keeping to make as much money as possible while managing a hot dog stand at a football stadium. The random situations introduced make the simulation unique each time it is used. In Foreman's Assistant, the most difficult program, students must be able to convert units of measure, work with area and perimeter, and buy materials to construct a room using the information provided. Accuracy in calculation is essential.

The program utilizes the computer's ability to randomly generate problems and events. Thus the same student, or a group of students, can use the same program over and over again. In addition, competition with oneself, teamwork, and competition with others, are incorporated into each program.

SURVIVAL MATH provides a practical approach to mathematical computing. Students who successfully complete the four simulations will be well prepared for the outside world.

This guide includes a complete description of each program as well as activity worksheets to accompany the programs.

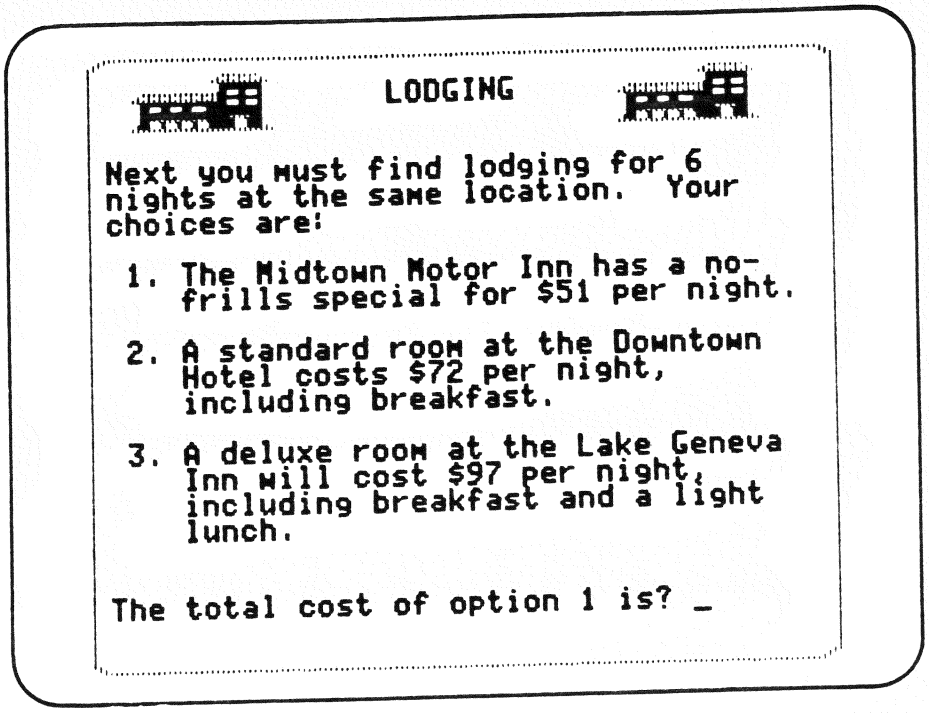
SURVIVAL MATH

Mathematical Skills Needed

	TRAVEL AGENT	SMART SHOPPER	HOT DOG STAND	FOREMAN'S ASSISTANT
Whole Numbers				
Adding two- and three-digit numbers with regrouping			x	x
Multiplying a one-digit number by a two-digit number			x	x
Dividing one- through four-digit numbers by one- and two-digit numbers			x	x
Whole Numbers -- Estimation				
Estimating the product of a one-digit number times a one- or two-digit number		x		x
Estimating the combined sum of several calculations	x		x	
Decimals				
Adding dollars and cents to dollars and cents	x		x	
Subtracting dollars and cents from dollars and cents	x		x	x
Multiplying dollars and cents by a whole number	x		x	x
Decimals -- Estimation				
Estimating the difference between two decimals		x		
Estimating the product of two decimals		x		
Estimating the quotient of two decimals		x		
Percent -- Estimation				
Estimating a fraction as a percent		x		
Measurement/Areas/Unit				
Applying the perimeter and area formulas for a rectangle				x
Converting square inches to square feet				x
Converting dozens to units, cases to units			x	

T R A V E L A G E N T C O N T E S T

Overview/Objectives


LODGING
Next you must find lodging for 6 nights at the same location. Your choices are:
1. The Midtown Motor Inn has a no-frills special for $51 per night.
2. A standard room at the Downtown Hotel costs $72 per night, including breakfast.
3. A deluxe room at the Lake Geneva Inn will cost $97 per night, including breakfast and a light lunch.
The total cost of option 1 is? _

Skills:	Addition, subtraction, multiplication Money/decimals Estimation
Students Work With:	Travel fares Motel rates Meal prices Ticket prices Budget
Grade Level:	7-12
Reading Level:	7th grade (Fry)
Time Required:	5-10 minutes for one plan
Objectives:	1. To provide students with practice in planning a course of action within a budget. 2. To provide students with practice in adding and subtracting decimal numbers. 3. To provide students with practice in multiplying whole numbers by decimals. 4. To develop students' skills in estimating.

TRAVEL AGENT CONTEST

Program Description

Students enter a "contest" for travel agents by planning a seven-day and six-night trip to a resort called Lake Geneva. The contest is judged on the basis of who comes closest to the expense limit for the trip without going over that limit.

When planning the trip, students must consider expenses for travel, lodging, food, and entertainment. As each expense category is selected, several options are given. For example, travel can be by plane, bus, or train. After selecting one of these options, students must calculate and enter the exact cost of that option from the given information.

When students enter a cost, the entry is identified as too high, too low, or correct. If the entry is not correct, the same cost is requested again. If it is correct, students are presented with the total amount they have spent at this point in the program, and they can enter the next expense category by pressing the P key.

Students have the option of starting over on the same trip. They can do so by pressing the S key. Students should use this option whenever they discover that they have made incorrect decisions during their planning. The values remain the same and students can make better decisions with the advantage of knowing these values.

Students also have the option of entering the contest again (see Exiting the Program, page 5). Each time the program is run, the maximum expense allowed is different, as are the costs of the various options within each category. Thus the program challenges students even after repeated use.

Playing Decisions

Students playing Travel Agent Contest are faced with the following decisions as they work their way through the program:

TRANSPORTATION: Students choose to travel by bus, train, or airplane. Some meals may be included in the transportation prices, which will help students to save money later. Students must calculate the round-trip fare based on the one-way figures provided.

MEALS WHILE TRAVELING: Meals are included in the costs of air and train travel, but students who travel by bus must purchase six meals from a limited menu. Here too, they are given several options. Students must choose the type of meals desired and calculate the cost for the number of days involved.

LODGING: Three different lodging options are provided. Some include meals. Students choose an option and calculate the total bill for the number of nights involved.

MEALS AT DESTINATION: Students choose the type of restaurant (from inexpensive to expensive), the type of meal (breakfast, lunch, or dinner), and the number of meals. They continue in the meal option until all meals are accounted for.

SPECIAL EVENTS: Three events are listed for evening entertainment in the resort destination, Lake Geneva. Prices differ for all three, and the cost of tickets differs within each option. Students also have the option of buying extra tickets for a friend. They continue in the Special Events Option until all six evenings are accounted for.

Exiting the Program

Students may exit the program at any time by doing the following:

ACORN, APPLE, ATARI, and COMMODORE: Hold down the CONTROL (CTRL) key and press the E key. The choice of starting Travel Agent Contest again or returning to the Main Menu will then be available.

TRS-80: When using a diskette, press the RESET button. This will start the disk over at the beginning. When using a cassette, press the BREAK key and type "RUN."

Classroom Use

This simulation is the easiest of the SURVIVAL MATH programs. Advise students that the "start over" option, described on page 4, does not change any values involved in decisions. One very good way for students to plan is to make all decisions on a "dry run," thereby seeing all of the values, then starting over with the advantage of knowing these values. Students who re-enter the program after returning to the Main Menu will be presented with a different set of values.

This program can be used by individuals or by small cooperative groups of two or three. If groups are formed, be sure all students become involved in completing the calculations.

Since the game aspect of the program allows students to compete for scores, more than one student might want to run the program in succession.

While working through the program, students will need to use a pencil and paper. Two Travel Agent Worksheets have been included in this guide to help students plan and record their expenses. Students and teachers can also choose to design their own worksheets.

TRAVEL AGENT CONTEST

The reproducible Travel Agent Worksheets, (pages 7 and 8) can be put to excellent use in recording results and analyzing decisions.

1. On their Travel Agent Worksheet A, students should record their daily expenses for their trip to Lake Geneva. This worksheet is included to help students who feel more comfortable working on one type of expense at a time for all 7 days. It can be used as an optional worksheet for those students who need it.

2. On their Travel Agent Worksheet B, students should transfer the figures recorded on their Worksheet A, and analyze the result of their decisions. This worksheet is set up to be used directly with the flow of the program as the questions are presented.

TRAVEL AGENT WORKSHEET A

TRANSPORTATION

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
$____	$____	$____	$____	$____	$____	$____

TOTAL COST OF TRANSPORTATION: $_____

LODGING

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
$____	$____	$____	$____	$____	$____

TOTAL COST OF LODGING: $_____

MEALS

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
(B)	$____	$____	$____	$____	$____	$____	$____	Total: $_____
(L)	$____	$____	$____	$____	$____	$____	$____	Total: $_____
(D)	$____	$____	$____	$____	$____	$____	$____	Total: $_____

TOTAL COST OF MEALS: $_____

SPECIAL EVENTS

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
$____	$____	$____	$____	$____	$____

TOTAL COST OF SPECIAL EVENTS: $_____

GRAND TOTAL: $_____

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TRAVEL AGENT WORKSHEET B

My expense limit is $_____.

My expenditures are:

TRANSPORTATION (round trip)

Type:_____ Cost: $_____

MEALS WHILE TRAVELING

Number:_____ Cost: $_____

LODGING

Type:_____ Cost: $_____

TOTAL COST: $_____

MEALS

Number of meals to plan for: _____

Breakfast	Lunch	Dinner
$_____	$_____	$_____
$_____	$_____	$_____
$_____	$_____	$_____
$_____	$_____	$_____
$_____	$_____	$_____
$_____	$_____	$_____

TOTAL COST: $_____

SPECIAL EVENTS

Number of nights: _____

Event: _____ Number of tickets _____ Cost: $_____

Event: _____ Number of tickets _____ Cost: $_____

Event: _____ Number of tickets _____ Cost: $_____

Event: _____ Number of tickets _____ Cost: $_____

Event: _____ Number of tickets _____ Cost: $_____

Event: _____ Number of tickets _____ Cost: $_____

TOTAL COST: $_____

GRAND TOTAL: $_____

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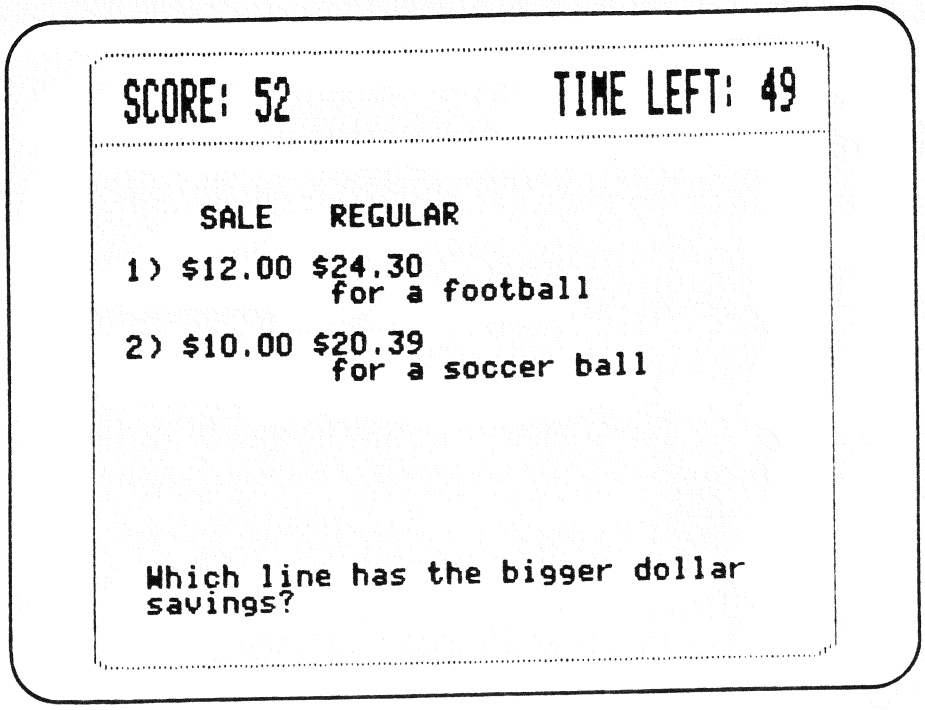
S M A R T S H O P P E R M A R A T H O N

Overview/Objectives



Skills:	Addition, subtraction, multiplication, division Money/decimals Percentages Measurement Estimation
Students Work With:	Unit pricing Weight Discounts
Grade Level:	7-12
Reading Level:	5th grade (Fry)
Time Required:	7-10 minutes for a single session
Objectives:	1. To provide students with a realistic setting in which to practice mathematics skills. 2. To drill students on estimation skills involving - division of a decimal by a whole number; - multiplication of two single-digit whole numbers; - subtraction of decimals to two places; - division of two decimals; - multiplication of a whole number times a decimal.

SMART SHOPPER MARATHON

Program Description

Students are contestants in the Smart Shopper Marathon. There are five aisles in the supermarket, and students must make the best purchases according to instructions given at the beginning of each aisle. The final score reflects both accuracy and speed.

Each aisle contains twenty-five displays and requires students to use a different skill for deciding on the best purchases. At each display, students must use the skill required by that aisle to determine the correct answer.

Each time this program is used, the order of the aisles is different. Similarly, the prices of the items in each aisle are also different. But each item is always realistically priced.

Students are given sixty clock ticks (not necessarily seconds) to complete each aisle. One point is scored for each correct answer, and there is a ten-tick penalty for each incorrect answer. A five-point bonus is given for reaching the end of an aisle. This is done by answering twenty-five questions before all sixty ticks have elapsed. There is no penalty for not completing an aisle.

Skills by Aisle

AISLE 1 -- lower unit price

Skill: estimation of division of a decimal by a whole number.

Example:

1) Pay $ .60 for 2 bars of soap
2) Pay $1.10 for 3 bars of soap

Which line has a lower unit price?

Since $.60/2 = $.30 for a bar of soap, and since $1.10/3 =$.37 for a bar of soap, students should choose the line #1.

AISLE 2 -- greater total weight

Skill: estimation of the product of two whole numbers.

Example:

1) Five 6 oz. jars of jelly
2) Three 7 oz. cans of tuna

Which line shows the greater total weight?

Since 5 jars of jelly x 6 oz. = 30 oz., and since 3 cans of tuna x 7 oz. = 21 oz., students should choose the line #1.

AISLE 3 -- bigger dollar savings

Skill: estimation of difference of two decimal numbers.

Example:

	Sale	Regular	
1)	3.15	3.80	for a garden hose
2)	2.95	3.50	for a fire alarm

Which line has the bigger dollar savings?

Since $3.80 - $3.15 = $.65 saving for a garden hose, and since $3.50 - $2.95 = $.55 saving for a fire alarm, students should choose the line #1.

AISLE 4 -- larger percent savings

Skill: estimation of a difference of two decimals and then division of the decimals.

Example:

	Regular	Sale	
1)	$6.09	$4.00	for footballs
2)	$12.30	$8.00	for soccer balls

Which line has the largest percent savings?

Since ($6.09 - $4.00)/$6.09 = 34% savings and since ($12.30 -$8.00)/$12.30 = 35% savings, students should choose the line #2.

AISLE 5 -- lower total price

Skill: estimation of the product of a whole number and a decimal.

Example:

1) Six for $3.03 [bottles of multi-vitamins]
2) Two for $7.00 [bottles of vitamin E]

Which line has the lower total price?

Since 6 bottles x $3.03 = $18.18, and since 2 bottles x $7.00 = $14.00, students should choose the line #2.

Exiting the Program

Students may exit the program at any time by doing the following:

ACORN, APPLE, ATARI, and COMMODORE: Hold down the CONTROL (CTRL) key and press the E key. The choice of starting Smart Shopper Marathon again or returning to the Main Menu will then be available.

TRS-80: When using a diskette, press the RESET button. This will start the program over at the beginning. When using a cassette, press the BREAK key and type "RUN."

Classroom Use

A perfect score of 150 (twenty-five points plus a five point bonus in each aisle) is very difficult to achieve. Encourage students to work at improving their own scores rather than judging their success by reaching 150.

Also encourage students to carefully estimate, rather than calculate, exact values. Those who compute exact answers will achieve very low scores. Finding exact answers will take too long, while incorrect guesses will result in time penalties.

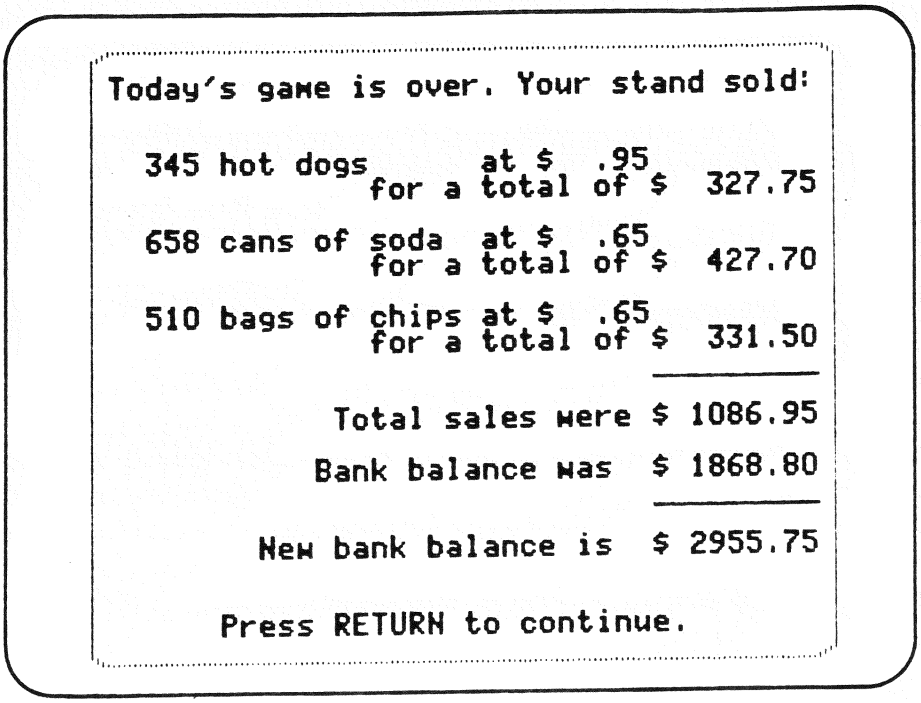
Some aisles require more skills than others. For example, AISLE 2, which requires estimation of the product of two whole numbers, is easier than AISLE 4, which requires students to calculate percent. However, the program can be used by all students, even if they do not possess all of the necessary skills. If, for example, they are in Aisle 4 but cannot yet calculate percent, they can guess rather than not use the simulation.

If possible, encourage students to use this program individually. Speed plays an important role in the program and conflicts that may arise during group use would slow down the game.

Use Smart Shopper Marathon to measure the success of classroom work on the skills it covers. You can do this by calculating the sum of all students' program scores both before and after such work.

H O T D O G S T A N D

Overview/Objectives


Today's game is over. Your stand sold:
345 hot dogs at $ .95 for a total of $ 327.75
658 cans of soda at $ .65 for a total of $ 427.70
510 bags of chips at $ .65 for a total of $ 331.50
Total sales were $ 1086.95
Bank balance was $ 1868.80
New bank balance is $ 2955.75
Press RETURN to continue.

Skills:	Addition, subtraction, multiplication, division Money Estimation Planning
Students Work With:	Unit pricing Setting sales prices Profit and loss Inventory
Grade Level:	7-12
Reading Level	5th grade (Fry)
Time Required:	10-40 minutes for a single session
Objectives:	1. To provide students with practice in planning expenses. 2. To provide students with practice in dealing with a situation in which random events influence the outcome. 3. To provide students with practice in - adding and subtracting decimals; - multiplying decimals by whole numbers.

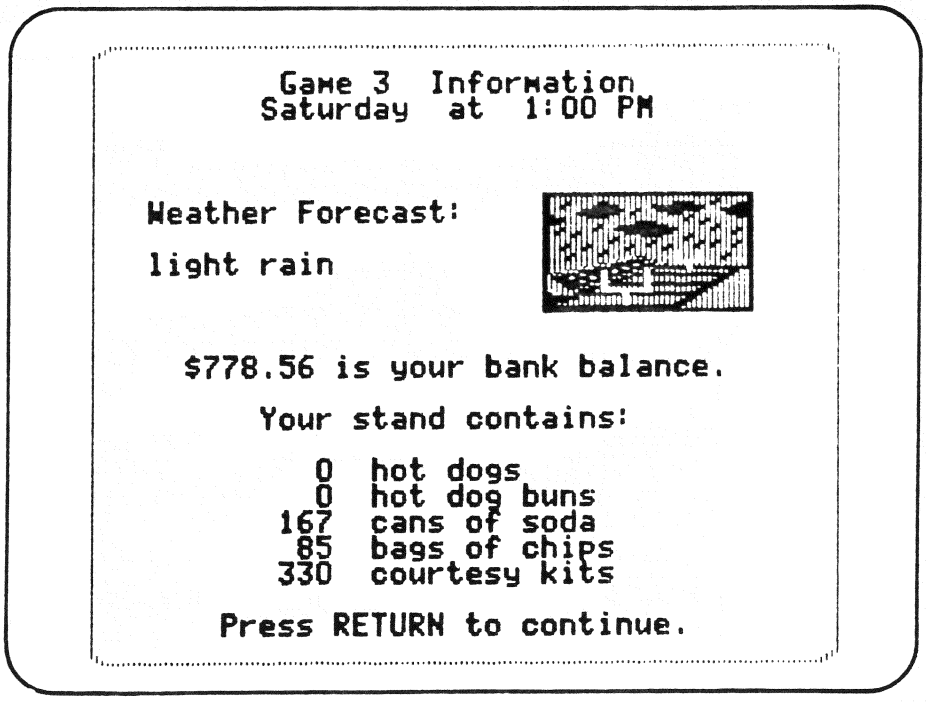
HOT DOG STAND

Program Description

Students operate a hot dog stand at eight football games. Before each game, students can elect to purchase hot dogs, buns, soda, chips, and courtesy kits (napkins, mustard, relish, carrying boxes, etc.) Three different qualities or unit prices are always available. On the day of the game, students must set the sales price of hot dogs, sodas, and chips, and then receive sales figures.

Students begin this simulation with $200. The suggested objective is to have $2,500 by the end of the football season.

At the beginning of the program, students are shown the seasonal football schedule for the eight games, including dates, times, and special circumstances such as homecoming or preseason events. Students then begin to work their way through the series of games. Before the start of each game, they are given a summary consisting of the weather forecast, the money on hand, and the current product inventory.



When the game day arrives, the weather may be different than the forecast. At this point, students set prices for hot dogs, sodas, and chips, based upon the inventory and the new weather information. (On the Apple and Acorn, students are given the unit cost of each item, which should help them with the pricing of these items.) The cost of buns and courtesy kits are included in the price of the hot dogs. Students are then shown the quantity of products consumed, the total income generated, and a new bank balance.

Several variables have been used to make this a realistic simulation. Students need to consider all of the following when making their decisions:

1. The stands can hold no more than 1000 fans.

2. Hot dogs cannot be sold without buns, or vice versa, so the purchase of these two items should always match.

3. Customers expect courtesy kits when they purchase hot dogs. If courtesy kits are not available, the sale of hot dogs will be greatly reduced.

4. Hot dogs and buns not sold each week are lost. Chips, soda, and courtesy kits can be saved and used at subsequent games.

5. Unit pricing varies with each game, so it is wise to stock up on certain non-perishable items early in the year.

6. Any items unsold after the last game are lost.

7. The size of the crowd has a direct effect on sales. Crowd size is affected by the following:

    * weather -- Poor weather will keep crowd size down.
    * type of game -- Preseason (smaller crowd) to homecoming (larger crowd)
    * time of day -- Evening games have larger crowds.
    * day of week -- Saturday crowds are larger than Friday crowds.

8. Pricing has a direct effect on sales. Overpriced items sell poorly while bargains sell very well, but underpricing can result in low profit.

9. Quality has also an effect on sales: low-quality hot dogs do not sell as well as high-quality ones.

10. Students should assume that all variables interact in a realistic fashion. For example, given the same size crowd, more sodas can be sold on a sunny day than on a rainy day.

This simulation will produce different football schedules, different unit pricing, and hence different results each time it is used. Success on one run does not assure the same result on subsequent runs.

Exiting the Program

Students may exit the program at any time by doing the following:

ACORN, APPLE, ATARI, and COMMODORE: Hold down the CONTROL (CTRL) key and press the E key. The choice of starting Hot Dog Stand again or returning to the Main Menu will then be available.

TRS-80: When using a diskette, press the RESET button. This will start the program over at the beginning. When using a cassette, press the BREAK key and type "RUN."

Classroom Use

This simulation is extremely effective when used by a group of two to six students. In general, a small group will be more likely to examine the many variables that can affect each decision than a large group or an individual.

One classroom-proven approach to Hot Dog Stand is to let students individually familiarize themselves with the simulation, discuss various strategies with the entire class, and then form small groups that compete over a period of days, or weeks, for the highest end-of-season profits. Certificates of achievement, displayed on the classroom bulletin board, can then be awarded to the winners. Students may want to organize themselves within each group electing a leader or chairperson, a secretary to take notes, and a treasurer to keep track of expenses.

The suggested goal -- an accumulation of $2,500 by the end of the football season -- is ambitious. Students should be encouraged to measure their present performance against their degree of success in the past.

Before moving on to the next football game, students should also be encouraged to analyze the results of each day's sales: why did one or more items sell especially well or especially poorly?

The reproducible Hot Dog Stand Worksheets (pages 17-20), can be put to excellent use in recording results and analyzing decisions.

1. Hot Dog Stand Worksheets A: students should be instructed to record on their worksheets the information regarding each of the eight games as soon as it appears on the screen with the football schedule. This information includes dates, times, and special circumstances, and is given only once during the program.

2. Hot Dog Stand Worksheet B: students should use this worksheet to draw a financial report at the end of the season, and to analyze their performance.

HOT DOG STAND WORKSHEET A

Game 1: Type of Game: _____ Day _____

Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

Game 2: Type of Game: _____ Day: _____

Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

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Game 3: Type of Game: _____ Day _____
Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

Game 4: Type of Game: _____ Day _____
Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

Game 5: Type of Game: _____ Day _____
Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

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Game 6: Type of Game: _____ Day _____
Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

Game 7: Type of Game: _____ Day _____
Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

Game 8: Type of Game: _____ Day _____
Time: _____ Weather: _____ Bank Balance: _____

	On Hand	Purchased	Total Cost	Cost Per Item	Price Charged	Sold	Income
Hot Dogs		Dozen					
Buns		Dozen					
Soda		Cases					
Chips		Bags					
Courtesy Kits		Kits					

Total Expenditures _____ Total Income _____

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HOT DOG STAND WORKSHEET B

_____
Date

_____
Company Name

OFFICERS

Chairperson: _____

Secretary: _____

Treasurer: _____

FINANCIAL REPORT

	EXPENSES		INCOME
Game 1	_____		_____
Game 2	_____		_____
Game 3	_____		_____
Game 4	_____		_____
Game 5	_____		_____
Game 6	_____		_____
Game 7	_____		_____
Game 8	_____		_____
TOTAL	_____	TOTAL	_____

SUMMARY

Opening Balance: $200.00

Closing Balance: $_____

TOTAL INCOME: _____

EXPENSES: _____

PROFIT: _____

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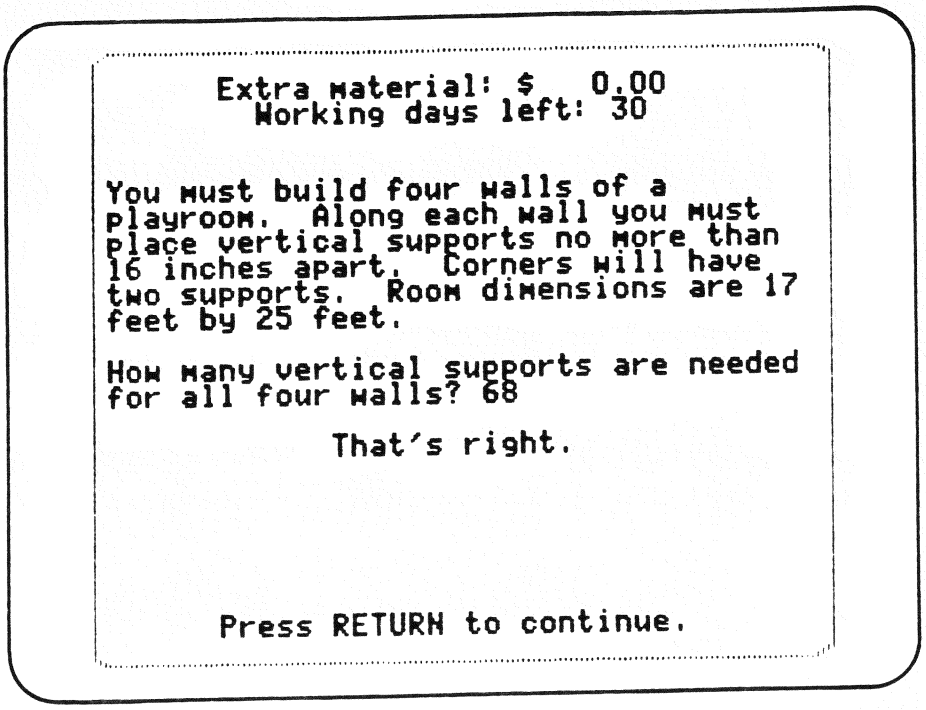
F O R E M A N ' S A S S I S T A N T

Overview/Objectives


Extra material: $ 0.00
Working days left: 30
You must build four walls of a playroom. Along each wall you must place vertical supports no more than 16 inches apart. Corners will have two supports. Room dimensions are 17 feet by 25 feet.
How many vertical supports are needed for all four walls? 68
That's right.
Press RETURN to continue.

Skills:
Addition, subtraction, multiplication, division
Money/decimals
Measurement
Estimation
Fractions

Students Work With:
Measurement conversion
Area
Construction techniques
Measurement of materials

Grade Level:
7-12

Reading Level:
6th grade (Fry)

Time Required:
10-20 minutes

Objectives:

1. To provide students with practice in
   - converting inches to feet and feet to inches;
   - division of decimal numbers by whole numbers;
   - multiplication of whole numbers and decimals;
   - addition and subtraction of whole numbers and decimals.
2. To provide students with practice in working with schematic drawings.
3. To provide students with practice in applying formulas for perimeters and areas.

FOREMAN'S ASSISTANT

Program Description

Students play the role of a construction foreman's assistant. Their job is to estimate the amount of material needed to finish six different tasks and to calculate the cost of each. The job must be done within thirty working days and without spending more than $50 for materials that will not be used.

The six tasks are those that might be faced when building a playroom. Although students should estimate the amount of material needed, the formulas used in the program are presented below:

L = length of long wall
S = length of short wall
[ ] = if the amount is an integer, take the next higher integer.
For example: $\left\lceil \frac{8 \times 2}{3} \right\rceil$ = 5.3, use that number, otherwise use 6 instead.

1. Given the dimensions (in feet) of a playroom, calculate the number of vertical supports needed if the supports are to be no more than sixteen inches apart and there are two supports in each corner.
   The formula used here is: $\left(\left(\left\lceil \frac{L \times 12}{16} \right\rceil + \left\lceil \frac{S \times 12}{16} \right\rceil \right) \times 2 \right) + 4$
2. Calculate how many 4- by 8-foot wall panels are needed to finish the walls of the same playroom.
   The formula used here is: $\left\lceil \frac{(L + S)2}{4} \right\rceil$
3. Given the dimensions (in inches) of a single brick (2.75 x 8.25), calculate the number of bricks needed to cover a short wall of the same playroom.
   The formula used here is: $\left\lceil \frac{8 \times 12}{2.75} \right\rceil \times \left\lceil \frac{S \times 12}{8.25} \right\rceil$
4. Given the number of square feet covered by a gallon of paint, calculate how much paint is needed to put two coats on three walls and the ceiling of the room.
   The formula used here is: $\left\lceil \frac{(S \times L) + (8 \times S) + (8 \times L \times 2)}{500} \times 2 \right\rceil$
5. If one of the short playroom walls is to be covered with bookshelves spaced 14 inches apart, and each shelf is one inch thick, calculate how many feet of shelf stock are needed.
   The formula used here is:
   [(96 - 8)/(14 + 1)] = 5, therefore [5 x S/12]
6. Calculate how many 9-inch square tiles are needed to cover the playroom floor.
   The formula used here is: [(S x 12)/9] x [(L x 12)/9]

After each task is described, students must estimate the quantity of material needed. Only estimates equal to, or greater than the materials actually needed, are acceptable. Estimates of insufficient material must be redone. Estimates that are too high are accepted, but the cost of the material that cannot be used is charged against the $50 limit.

After an estimate is accepted, students must calculate the exact price of the materials. If the calculation is incorrect, a "too high" or "too low" response is given, and a new calculation must be entered.

All entries affect the number of working days. An acceptable materials estimate consumes two days. An unacceptable materials estimate consumes four days since this results in having employees with nothing to do. All cost entries, right or wrong, consume one day.

Exiting the Program

Students may exit the program at any time by doing the following:

ACORN, APPLE, ATARI, and COMMODORE: Hold down the CONTROL (CTRL) key and press the E key. The choice of starting Foreman's Assistant again or returning to the Main Menu will then be available.

TRS-80: When using a diskette, press the RESET button. This will start the program over at the beginning. When using a cassette, press the BREAK key and type "RUN."

Classroom Use

This is the most difficult of the SURVIVAL MATH programs. Students should have pencil and paper available. They can use their own calculator or the built-in calculator available on the Apple.

It is important that students remember the exact dimensions of the room. Without these dimensions, they cannot complete their tasks successfully. The program will remind them at times of the dimensions of the room, but it is a good habit for students to record them.

Although one can develop formulas for each of the material estimates, this is not the intent of the simulation. The purpose of the program is to have students estimate the amount of material needed, and to calculate the cost of the materials. Students should complete their estimate using only formulas that are self-generated. Most students will use a variety of techniques without developing a formula.

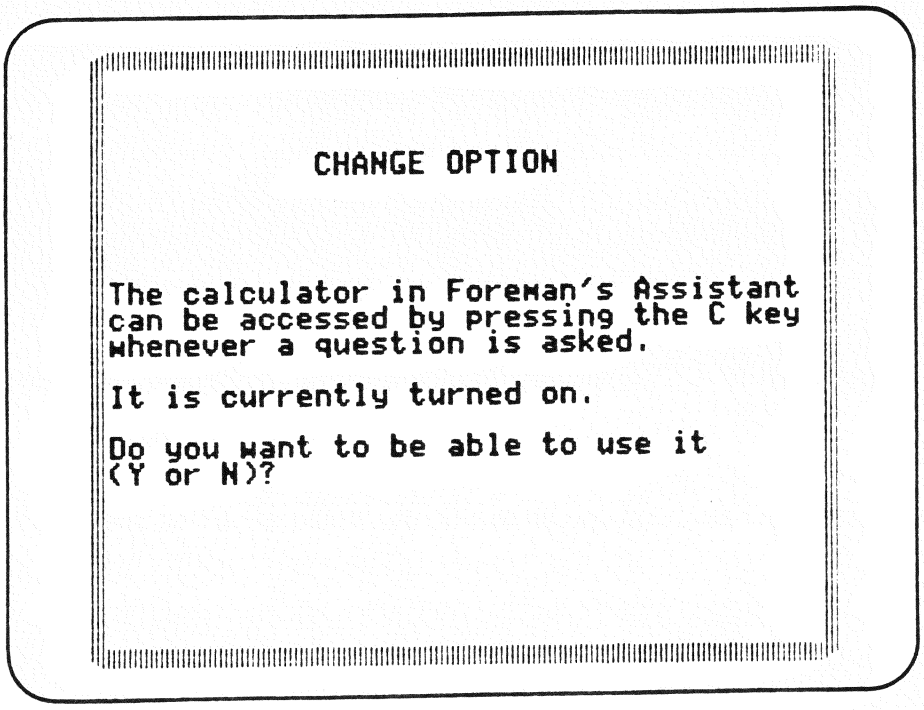
This program should be used by groups of three or four students at a time. Because the calculations must be done carefully, all members of the group should do them and then compare answers prior to entering the results. Students should be encouraged to determine why an answer is incorrect.

The reproducible Foreman's Assistant Worksheet (pages 27 and 28) can be used as a guide for students who are having difficulty with calculations.

Change Option -- APPLE ONLY

The Change Option gives teachers the choice of letting students use a built-in calculator with the Foreman's Assistant program.

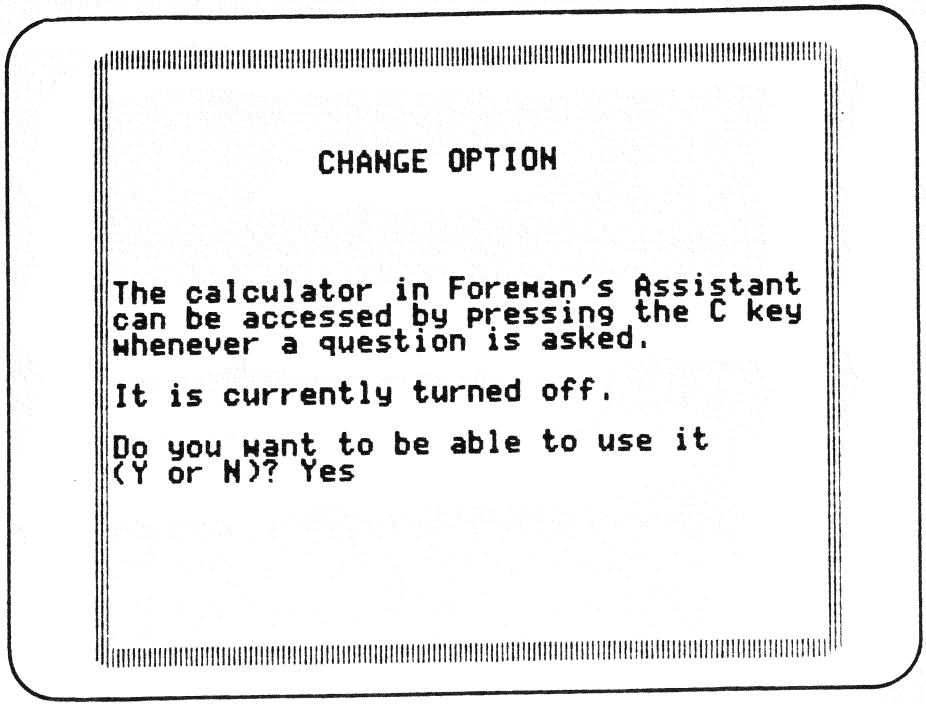
The Change Option can be accessed from the Main Menu by holding down the CONTROL (CTRL) key and pressing the T key. A Change Option menu is then displayed on the screen:


CHANGE OPTION
The calculator in Foreman's Assistant can be accessed by pressing the C key whenever a question is asked.
It is currently turned on.
Do you want to be able to use it (Y or N)?

To make the calculator available to the students, type in Y after the question and press the RETURN key. This will bring the Main Menu back to the screen. Students can then access the calculator during the Foreman's Assistant program by pressing the C key whenever they need to make a calculation.

To turn the calculator off, type in N after the question and press the RETURN key. This will bring the Main Menu to the screen, and the calculator will not be available to students during the program.

Once a command has been entered in the Change Option, it is saved on the disk for future runs, until the Change Option is accessed again and a new command is entered.

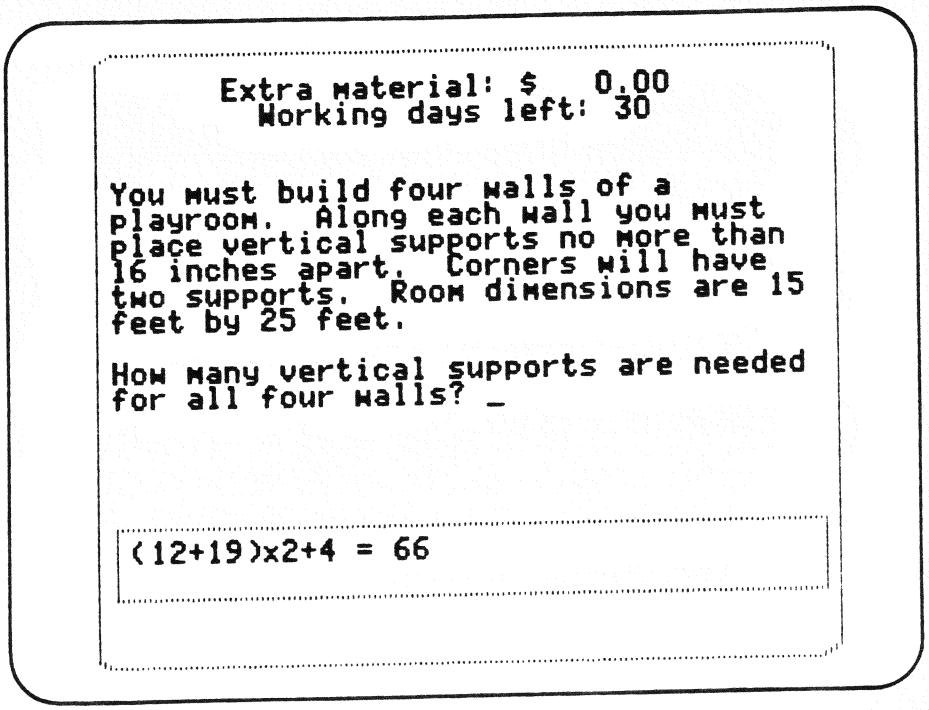

CHANGE OPTION
The calculator in Foreman's Assistant can be accessed by pressing the C key whenever a question is asked.
It is currently turned off.
Do you want to be able to use it (Y or N)? Yes

It is important to remember that the Change Option can be accessed only from the Main Menu. It cannot be accessed while the program is running.

Built-in Calculator -- APPLE ONLY

Once the calculator has been turned on with the Change Option, students can access it by pressing the C key whenever a question is asked in the Foreman's Assistant program.

The calculator is a rectangular box which appears on the screen below the text.


Extra material: $ 0.00
Working days left: 30
You must build four walls of a playroom. Along each wall you must place vertical supports no more than 16 inches apart. Corners will have two supports. Room dimensions are 15 feet by 25 feet.
How many vertical supports are needed for all four walls? _
(12+19)x2+4 = 66

Students can use this calculator to add, subtract, multiply, and divide numbers between 0.00 and 9999.99. Numbers are accepted up to two places to the right of the decimal point. The operations are accessed as follows:

1. Addition: press either the + or P key.
2. Substraction: press the - key.
3. Multiplication: press either the x or * key.
4. Division: press the / key.

After typing in the equation, press the RETURN key. The equation will then be displayed with required parentheses, and the answer will be presented. Parentheses will be placed after any multiplication or division preceded by additions or subtractions.

For example :

2 + 23 x 5 + 3 = (2 + 23) x 5 + 3
2 + 23 x 5 + 9 + 8 x 2 = ((2 + 23) x 5 + 9 + 8) x 2

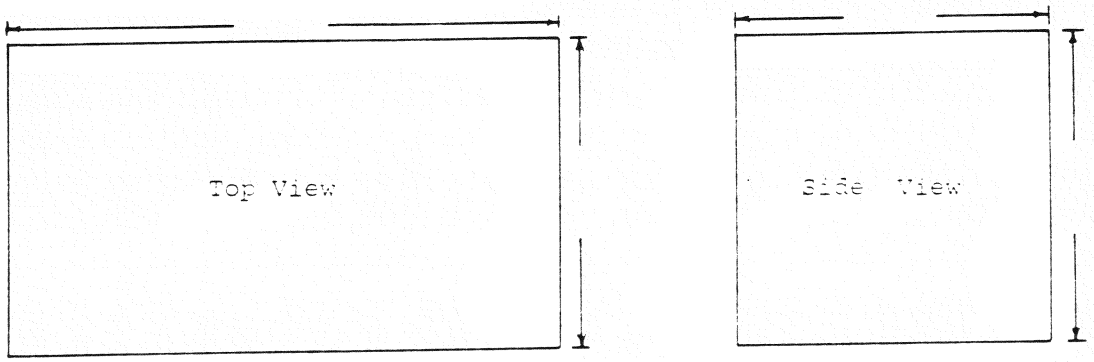
To erase a number or an equation, press either the or DELETE key before pressing the RETURN key. To perform a new calculation after an answer has been displayed, press the C key. This will clear the equation and the answer, and will bring back the calculator on the screen.

FOREMAN'S ASSISTANT WORKSHEET

YOU MUST COMPLETE THE CONSTRUCTION IN 30 DAYS!

Dimensions of the room are _____ x _____ x _____

Decision 1: Number of Vertical Supports



Vertical Supports are 16 inches apart and two are in each corner.

_____ Number of supports needed for long wall

_____ Number of supports needed for short wall

_____ Number of extra supports required for corners

_____ Total supports

Decision 2: Number of Panels

_____ Number of panels for long wall

_____ Number of panels for short wall

_____ Total panels

Decision 3: Number of Bricks

_____ Number of bricks in one row

_____ Number of rows

_____ Total bricks

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FOREMAN'S ASSISTANT WORKSHEET (Page 2)

Decision 4: Amount of Paint

_____ Square feet of ceiling

_____ Square feet of long wall of room

_____ Square feet of short wall of room

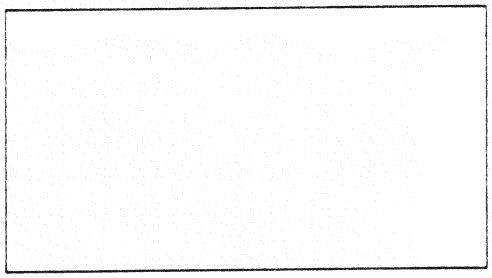
_____ Total square feet of room and ceiling

_____ Square feet per gallon

_____ Total gallons of paint

Decision 5: Number of Boards

Sketch the bookcase:



_____ Number of boards for one length

_____ Number of lengths

_____ Total boards

Decision 6: Number of Tiles

_____ Tiles for one length of the room

_____ Tiles for one width of the room

_____ Total tiles

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ACORN: WORKING WITH THE COMPUTER

TURNING ON THE COMPUTER:

1. Turn on the television or monitor.

2. If your disk drive has a power switch on the back then turn it on at this time.

3. Turn on the ACORN computer. The switch is located in the rear. After a few seconds the screen will display:

```
ACORN OS
ACORN DFS
BASIC
>_
```

4. Insert the diskette into the disk drive with the oval shaped opening entering first and the label to the right.

5. Close the disk drive door.

6. While holding down the SHIFT key, press and release the BREAK key.

7. SUNBURST will appear on the screen, followed by the opening screen of the program.

8. Follow the directions given in the program.

9. If you wish to stop during the program, hold down the CONTROL (CTRL) key and press E.

TURNING OFF THE COMPUTER:

1. Remove the diskette from the disk drive and return it to its place of storage.

2. Turn off the computer.

3. Turn off the television or monitor.

4. Turn off the disk drive.

APPLE: WORKING WITH THE COMPUTER

TURNING ON THE COMPUTER:

1. Turn on the television monitor.

2. Insert the diskette into the disk drive with the label facing up and on the right.

3. Close the door to the disk drive.

4. Turn on the Apple. (The on-off switch is on the back left side of the computer.)

5. You will see a red light on the disk drive turn on. If the disk drive does not turn on in about ten seconds, turn the Apple off and make sure your diskette is placed correctly in the disk drive.

6. SUNBURST will appear on the screen.

7. Follow directions given in the program.

8. If at any time during the program you want to stop and begin again, hold the CONTROL (CTRL) key and press the E key.

TURNING OFF THE COMPUTER:

1. Remove the diskette from the disk drive and return it to its place of storage.

2. Turn off the Apple.

3. Turn off the television or monitor.

ATARI: WORKING WITH THE COMPUTER

TURNING ON THE COMPUTER:

1. Turn on the television or monitor.

2. The disk drive must be turned on before the computer. Turn on the disk drive using the switch on the front. Two lights will come on, the "PWR ON" light and the disk "BUSY" light. After about ten seconds, the BUSY light should go off.

3. Insert a diskette with the exposed oval "window" inserted first and the label side up.

4. Close the door on the disk drive.

5. Turn on the computer. The power switch is located on the side of the computer. The disk drive will turn on again.

6. A menu will appear with a list of available programs. Make a selection by moving the box with arrow keys and pressing the RETURN key.

7. Follow the instructions in the program.

8. If at any time during the program you want to stop and begin again, hold the CONTROL (CTRL) key and press the E key.

TURNING OFF THE COMPUTER:

1. Remove the diskette.

2. Turn off the disk drive, the television, and the Atari.

COMMODORE 64: WORKING WITH THE COMPUTER

TURNING ON THE COMPUTER:

1. Turn on the television or monitor.

2. The disk drive must be turned on before the computer. Turn on the disk drive (the switch is located at the back right side of the drive).

3. Open the door of the drive by pressing in on the door. Insert the diskette with the exposed oval window inserted first and the label up.

4. Close the door on the disk drive.

5. Turn on the computer. You will see the words--

```
     *****COMMODORE 64 BASIC V2*****
64K RAM SYSTEM 38911 BASIC BYTES FREE
READY.
```

6. Type LOAD "Ø:*",8 and press the Return Key. The red light on the disk drive will come on. The computer will print--

```
"Searching for Ø"
LOADING
READY.
```

7. Type RUN and press the RETURN key.

8. If any time during the program you want to stop, hold the CONTROL (CTRL) key and press the E key.

TURNING OFF THE COMPUTER:

1. Remove the diskette.

2. Turn off the disk drive, computer and television.

TRS-80: WORKING WITH THE COMPUTER (Diskette)

TURNING ON THE COMPUTER:

1. Insert the diskette into the disk drive with the label facing up and on the right.

2. Close the door to the drive.

3. Turn on the computer.

4. You will see a red light on the disk drive light up. If the disk drive does not turn off in about 25 seconds, turn off the TRS-80 and make sure the diskette is placed correctly in the disk drive.

5. SUNBURST will appear on the screen, followed by a menu of programs.

6. Select the program you want from the menu.

7. If, at any time during the program, you want to stop and begin again, press the RESET button. The program will load and run from the beginning.

TURNING OFF THE COMPUTER:

1. Remove the diskette from the disk drive and return it to its place of storage.

2. Turn off the TRS-80.

TRS-80: WORKING WITH THE COMPUTER (Cassette)

TURNING ON THE COMPUTER:

1. Turn on the video if it is separate from the computer.

2. Turn on the computer. If your TRS-80 has a disk drive, hold the BREAK key down while you turn on the computer. If you have a Model III or Model 4 TRS-80, type L and press ENTER when the computer asks "CASS?".

3. Choose the tape you wish to use.

4. Insert the tape in the tape recorder (the label of the program you want should be facing up).

5. Make sure the tape is rewound.

6. Press the PLAY button on the tape recorder.

7. Type CLOAD and press the ENTER key. (This starts the tape recorder.)

8. Two stars (**) will appear and blink on the top line of the screen. This indicates the program is loading.

   If you don't see two stars (one star should be blinking) in the upper right-hand corner in about 30 seconds--

   - reset the computer (see How to Reset the Computer);
   - check the volume control (it should be set between 6 and 8);
   - make sure all the plugs are in place, and
   - try again, starting at Step 4.

9. When READY appears on the screen, press REWIND. Return the tape to its box. The program is now loaded into the computer's memory.

10. Type RUN and press ENTER.

11. Follow instructions that appear on the screen.

RESETTING THE COMPUTER (to stop the program and begin again):

When you press the RESET button, it resets the computer without erasing the memory. With the Model I (separate keyboard and monitor), the RESET button is located at the left rear of the keyboard (inside of a small door).

The Model III and Model 4 are reset by the BREAK key (on the keyboard). When you reset the computer, the word READY will appear on the screen. You are now back in control and can run the program again. Type RUN and press ENTER, or load a new program from tape.

TURNING OFF THE COMPUTER:

1. Turn off the video display if it is separate from the computer.

2. Turn off the computer.

"WHAT HAPPENS IF...?" SUNBURST COURSEWARE AND WARRANTY

1. What happens if a program will not load or run?

   Call us on our toll-free number and we will send you a new tape or diskette.

2. What if I find an error in the program?

   We have thoroughly tested the programs that SUNBURST carries so we hope this does not happen. But if you find an error, please note what you did before the error occurred. Also, if a message appears on the screen, please write the message down. Then fill out the evaluation form and call us with the information. We will correct the error and send you a new diskette.

3. What happens if the courseware is accidentally destroyed?

   SUNBURST has a lifetime guarantee on its courseware. Send us the product that was damaged and we will send you a new one.

4. How do I stop the program in the middle to go on to something new?

   A program can be ended at any time by doing the following:

   ACORN, APPLE, ATARI, and COMMODORE: Hold down the CONTROL (CTRL) key while pressing the E key.

   TRS-80: When using a diskette, press the RESET button. When using a cassette, press the BREAK key and type "RUN."

5. Can I copy this diskette?

   The material on the diskette is copyrighted. You <u>should not</u> copy the courseware.

6. Can I remove the diskette from the disk drive while using the program?

   Depending on your machine, some of the programs need to access the diskette as they are running and therefore must have the diskette left in the disk drive.